



# UNITED STATES PATENT AND TRADEMARK OFFICE

*du*  
UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/781,015	02/17/2004	Guy Bemis	14435-003001 / VPI/03-05-	2429
26161 7590 03/22/2007 FISH & RICHARDSON PC P.O. BOX 1022 MINNEAPOLIS, MN 55440-1022			EXAMINER ZHOU, SHUBO	
			ART UNIT	PAPER NUMBER
			1631	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/22/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

**Office Action Summary**

Application No.

10/781,015

Applicant(s)

BEMIS ET AL.

Examiner

Shubo (Joe) Zhou

Art Unit

1631

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 29 December 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-34 is/are pending in the application.
- 4a) Of the above claim(s) 32 and 33 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-31 and 34 is/are rejected.
- 7) ☒ Claim(s) 1-31 and 34 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 August 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 12/3/04, 3/14/05.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Election/Amendments***

Applicants' election, without traverse, of Group I (claims 1-31 and 34) in the response filed 12/29/06 is acknowledged.

Claims 1-34 are currently pending, and claims 1-31 and 34 are under examination. Claims 32-33 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 12/29/06.

### ***Information Disclosure Statement***

The Information Disclosure Statements filed 12/3/04 and 3/14/05 have been entered and documents therein have been considered. Initialed copies of the form PTO-1449 are enclosed herein.

### ***Drawings***

It is noted that replacement sheets of the drawings including were filed 8/17/04. 37 CFR 1.121(d) requires:

Drawings : One or more application drawings shall be amended in the following manner: Any changes to an application drawing must be in compliance with § 1.84 and must be submitted on a replacement sheet of drawings which shall be an attachment to the amendment document and, in the top margin, labeled "Replacement Sheet". Any replacement sheet of drawings shall include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is amended. Any new sheet of drawings containing an additional figure must be labeled in the top margin as "New Sheet". All changes to the drawings

Art Unit: 1631

shall be explained, in detail, in either the drawing amendment or remarks section of the amendment paper.

The amended drawings filed 8/17/04 are not completely compliant with 37 CFR 1.121(d) as not being labeled "Replacement Sheet."

### *Specification*

The specification is objected to because of the following including informalities:

The title of the invention is not descriptive. The elected invention is drawn to a method for modeling complex formation between a query ligand and a target macromolecule. The current title, however, is generically directed to "Molecular Modeling Methods." A new title is required that is clearly indicative of the invention to which the elected claims are directed.

Trademarks are used in this application, such as CHEMDRAW on page 27. Trademarks should be capitalized wherever they appear and be accompanied by the generic terminology. Although the use of trademarks is permissible in patent applications, the proprietary nature of the marks should be respected and every effort made to prevent their use in any manner which might adversely affect their validity as trademarks.

The disclosure is objected to also because it contains an embedded hyperlink and/or other form or browser-executable code. Such code is present in the specification at page 27 and elsewhere. Applicants are required to delete the embedded hyperlink and/or other form of browser-executable code. See MPEP ' 608.01.

Applicant is reminded of the proper content of an abstract of the disclosure. A patent abstract is a concise statement of the technical disclosure of the patent and should include that which is new in the art to which the invention pertains. If the patent is of a basic nature, the

entire technical disclosure may be new in the art, and the abstract should be directed to the entire disclosure. If the patent is in the nature of an improvement in an old apparatus, process, product, or composition, the abstract should include the technical disclosure of the improvement. In certain patents, particularly those for compounds and compositions, wherein the process for making and/or the use thereof are not obvious, the abstract should set forth a process for making and/or use thereof. If the new technical disclosure involves modifications or alternatives, the abstract should mention by way of example the preferred modification or alternative.

The abstract should not refer to purported merits or speculative applications of the invention and should not compare the invention with the prior art.

Where applicable, the abstract should include the following:

- (1) if a machine or apparatus, its organization and operation;
- (2) if an article, its method of making;
- (3) if a chemical compound, its identity and use;
- (4) if a mixture, its ingredients;
- (5) if a process, the steps.

In the instant case, the elected invention is drawn to a method process for modeling complex formation between a query ligand and a target macromolecule. The abstract filed 2/12/04, however, only contains one sentence: "The invention relates to methods for modeling molecular structures" without setting out the steps of the method process.

Tables are present on pages 35-41 and part of page 42, which are not named but appear to be continuation of Table I. If this is true, then the tables should be so indicated.

Appropriate correction is required.

***Claim Rejections-35 USC § 101***

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-31 and 34 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

The claims are drawn to a computer process or apparatus comprising computer programs for executing the process, the process comprising: a) providing a structural model of a query ligand and a structural model of a target macromolecule; b) identifying a substructure of the query ligand; c) identifying comparison ligands in a set of 3-D structural models that each share an identical substructure with the query ligand, wherein each 3-D structural model comprises a comparison ligand and a comparison macromolecule, and wherein the comparison macromolecule has structural features homologous to the target macromolecule; d) mapping spatial relationships between the substructure atoms of the query ligand and the comparison ligand such that corresponding atoms are identified; e) assigning atomic coordinates to the corresponding atoms of the query ligand; f) generating one or more output models, each model comprising a 3-D structural model of the query ligand substructure and the target macromolecule, wherein the 3-D model of the query ligand substructure comprises the atomic coordinates of the query ligand from step (e).

The following analysis of facts of this particular patent application follows the rationale suggested in the "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility" (OG Notices: 22 November 2005, available from the US PTO website at <http://www.uspto.gov/web/offices/com/sol/og/2005/week47/og200547.htm>).

The Guidelines states:

Art Unit: 1631

*To satisfy section 101 requirements, the claim must be for a practical application of the § 101 judicial exception, which can be identified in various ways (Guidelines, p. 19):*

- The claimed invention "transforms" an article or physical object to a different state or thing.*
- The claimed invention otherwise produces a useful, concrete and tangible result, based on the factors discussed below.*

In the instant case, at least one embodiment of the claimed invention merely manipulates structural data of molecule and performs a series of calculations for molecular modeling. Thus, the process does not appear to transform an article or physical object to a different state or thing outside a computation device. Even though claim 27 recites a step of "obtaining physical samples comprising a subset of the query ligands," it is not clear what relationship the step has in relation to other steps of the computational modeling and the step to obtain physical sample does not appear to represent physical transformation for the computational modeling comprising at least steps a) through f).

Furthermore, the invention does not produce a useful, concrete and tangible result. Specifically it does not produce a tangible result. Since the process, at least for one embodiment of the claimed invention, merely manipulates molecular structural data and performs a series of calculations for modeling entirely in the confine of a computational device without using or making available for use the results of the data manipulation to enable its functionality and usefulness to be realized. While step f) generates one or more output models, there is no clear indication that the models are outputted to a user to use the results of the data manipulation.

### ***Claim Rejections-35 USC § 112***

The following is a quotation of the **second** paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-31 and 34 are rejected under 35 U.S.C. 112 , second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The preambles of the claims such as claim 1 recite a “method for modeling complex formation between a query ligand and a target macromolecule.” The method steps, however, do not produce such a model of complex formation. It is thus unclear what other steps are needed for such a modeling of complex formation.

Step (c) of claim 1 recites a “comparison macromolecule has structural features homologous to the target macromolecule.” The term "homologous" is a relative term that renders the claim indefinite. The term is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. When the 3-D structures of two molecules are compared, some part of the molecules might share the same atoms at corresponding positions, and some different atoms might share the same spatial shape or form. Without an explicit standard or criteria for determining whether two structures are homologous, it would not be clear to one skilled in the art what structures are homologous and what are not.

Step (d) recites the phrase “the comparison ligand,” which lacks clear antecedent basis because it is not clear which singular “comparison ligand” is meant from the plural “comparison ligands in a set of 3-D structural models.”

Claims 30 and 31 are rejected because they also contain these same indefinite limitations as those set forth above for claim 1.

Claim 5 recites the phrase “non-substructure atoms of the query ligand are represented.” The metes and bounds of the meaning of the limitation are unclear. Any atom of a molecule is a part of certain substructure of the molecule, and it is thus not clear what is meant by “non-substructure atoms of the query ligand.”



Claim 7 recites “[t]he method of claim 1, wherein the substructure comprises 2-D structural information.” The phrase “the substructure” lacks clear antecedent basis because there are multiple substructures recited in claim 1 including at least the “substructure of the query ligands” recited in step (b) and the “substructure atoms of the query ligand and the comparison ligand” recited in step (d). It is thus not clear which “substructure” is referred to in claim 7.

Claim 9 recites the phrase “the cyclic portions,” which lacks clear antecedent basis because there is prior reference to cyclic portions, and it is thus unclear what they are.

Claim 10 recites “wherein the substructure comprises a substructure in which at least 5, 7, or 10 atoms are identical in the comparison ligand(s).” The metes and bounds of the limitations are not clear because it is unclear as to whether it is meant that at least 5, 7, or 10 atoms within each molecule of the comparison ligands are identical, or it is meant that 5, 7, or 10 atoms are identical in all the comparison ligands, or it is meant at least 5, 7, or 10 atoms of the query ligand are identical to those atoms in the comparison ligands, or else. Furthermore, it is not clear what is meant by “ligand(s)” in the context of the claim.

Claim 11 recites “[t]he method of claim 1, wherein the substructure comprises 3-D structural information.” The phrase “the substructure” lacks clear antecedent basis because there are multiple substructures recited in claim 1 including at least the “substructure of the query ligands” recited in step (b) and the “substructure atoms of the query ligand and the comparison ligand” recited in step (d). It is thus not clear which “substructure” is referred to in claim 11.

Claim 12 recites “[t]he method of claim 1, wherein the substructure comprises a pharmacophore.” The phrase “the substructure” lacks clear antecedent basis because there are multiple substructures recited in claim 1 including at least the “substructure of the query ligands” recited in step (b) and the “substructure atoms of the query ligand and the comparison ligand” recited in step (d). It is thus not clear which “substructure” is referred to in claim 12.

Claim 13 recites “[t]he method of claim 12, wherein the identifying the pharmacophore comprises ....” The phrase “the identifying the pharmacophore” lacks adequate antecedent basis because there is no prior reference to identifying a/the pharmacophore in claim 12 or in claim 1 from which claim 12 depends.

Claim 25 recites “determining one or more ... intramolecular strain energy between the substructure and target macromolecule.” The metes and bounds of the claimed invention are unclear because first of all the phrase “the substructure” lacks clear antecedent basis as there are multiple substructures recited in claim 1, from which claim 25 indirectly depends, including at least the “substructure of the query ligands” recited in step (b) and the “substructure atoms of the query ligand and the comparison ligand” recited in step (d). It is thus not clear which “substructure” is referred to in claim 25. Furthermore, it is confusing as to what is meant by “intramolecular strain energy between the substructure and target macromolecule.” If it is intramolecular strain, then it is within one molecule; and if it is between two molecules, then it is not intramolecular.

Claim 27 recites “obtaining physical samples comprising a subset of the query ligands, wherein the ligands of the subset are assigned a preselected score. The metes and bounds of the claimed invention are unclear for two folds. First, it is unclear what is the relationship between this step of obtaining physical samples of a subset of the query ligands with the other steps of computational modeling: is it the result of the modeling, or the step can be anywhere in the process of the modeling, i.e. it can happen before or after any step of the process, e.g. in claim 1. Second, it is unclear what is meant by “the ligands of the subset are assigned a preselected score.” Does it mean that a preselected score is assigned to the plural “ligands of the subset,” or that a preselected score is assigned to each of the plural “ligands of the subset.”

Claim 30 recites “a memory that stores executable instructions for modeling ...” in item (a). The phrase is confusing because it is not clear whether it means that the instructions are only executable by a computer or it can also be by a person.

The phrase “the compound” recited in claim 34, lines 4 and 6, lacks adequate antecedent basis because there is prior reference to at least two compounds: a ligand and a target macromolecule. Thus it is unclear which one of the two compounds is meant in line 4 or 6.

The phrase “the test ligand” recited in claim 34, lines 8 and 9, lacks clear antecedent basis because there are prior reference to multiple test ligands: “a test ligand” in the preamble and a plurality of “test ligands” in 5, and thus it is unclear which one of these plurality of test ligands is meant in line 8 or 9 of claim 34.

Clarification of the metes and bounds of the claims is requested.

### ***Claim Objections***

Claims 1-31 and 34 are objected to because of the following reasons including informalities:

The phrase recited in step (c) of claim 1, “identifying comparison ligands in a set of 3-D structural models that each share an identical substructure with the query ligand ...” is grammatically awkward. Is the word “so” missing in between the words “models” and “that?” It also appears that the singular tense of share, i.e. “shares” would be grammatically proper.

Appropriate correction is required.

### ***Conclusion***


No claim is allowed.

Art Unit: 1631

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shubo (Joe) Zhou, whose telephone number is 571-272-0724. The examiner can normally be reached Monday-Friday from 8 A.M. to 4 P.M. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Irem (Remy) Yucel, Ph.D., can be reached on 571-272-0781. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Patent applicants with problems or questions regarding electronic images that can be viewed in the Patent Application Information Retrieval system (PAIR) can now contact the USPTO's Patent Electronic Business Center (Patent EBC) for assistance. Representatives are available to answer your questions daily from 6 am to midnight (EST). The toll free number is (866) 217-9197. When calling please have your application serial or patent number, the type of document you are having an image problem with, the number of pages and the specific nature of the problem. The Patent Electronic Business Center will notify applicants of the resolution of the problem within 5-7 business days. Applicants can also check PAIR to confirm that the problem has been corrected. The USPTO's Patent Electronic Business Center is a complete service center supporting all patent business on the Internet. The USPTO's PAIR system provides Internet-based access to patent application status and history information. It also enables applicants to view the scanned images of their own application file folder(s) as well as general patent information available to the public. For all other customer support, please call the USPTO Call Center (UCC) at 800-786-9199.

sz/SZ



SHUBO (JOE) ZHOU, PH.D.  
PATENT EXAMINER